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ORIGINAL

June 19, 2002

RECEIVED

JUN 19 2002

FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

By Hand

Marlene H. Dortch, Secretary
Federal Communications Commission
445 12th Street, N.W.
Washington, DC 20554

Re: *Ex Parte* - File Nos. ET Docket No. 98-206, IB Docket No. 01-96
48-SAT-P/LA-97, 89-SAT-AMEND-97, 130-SAT-AMEND-98

Dear Ms. Dortch:

On June 18, 2002, Damien Garot, Manager, Products and Services, SkyBridge L.P. and the undersigned, attorney for the SkyBridge L.P., met in person, and Didier Casasoprana, Chief Engineer, SkyBridge L.P., met telephonically, with Diane Garfield, Jennifer Gilsenan, Scott Kotler, Kal Krautkramer and J. Mark Young, all of the International Bureau, for the purpose of discussing the substance and timing of the demonstration by Ku-band NGSO FSS applicants of compliance with the validation EPFD limits in accordance with ITU and FCC rules. The attached document was distributed at the meeting.

Respectfully submitted,

Diane C. Gaylor

Diane C. Gaylor
Attorney for SkyBridge L.P.

Attachment

cc (w/attachment):
Diane Garfield
Jennifer Gilsenen
Scott Kotler
Kal Krautkramer
J. Mark Young

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Doc#: DC1: 128327_1

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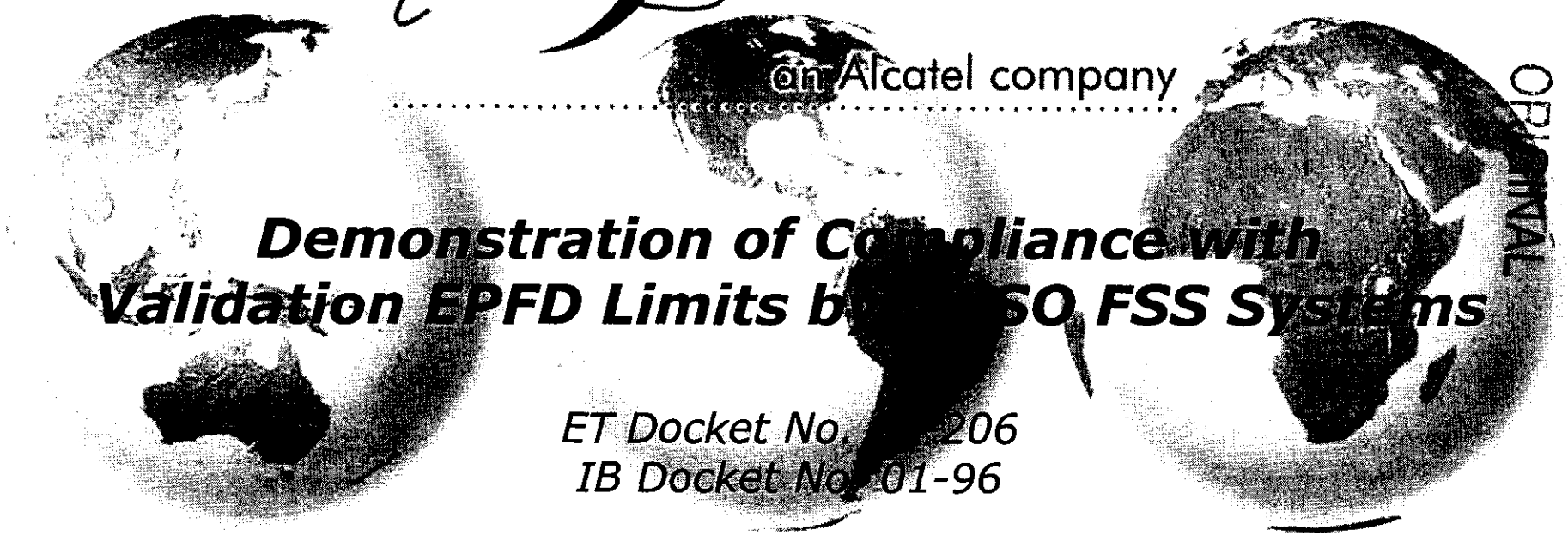


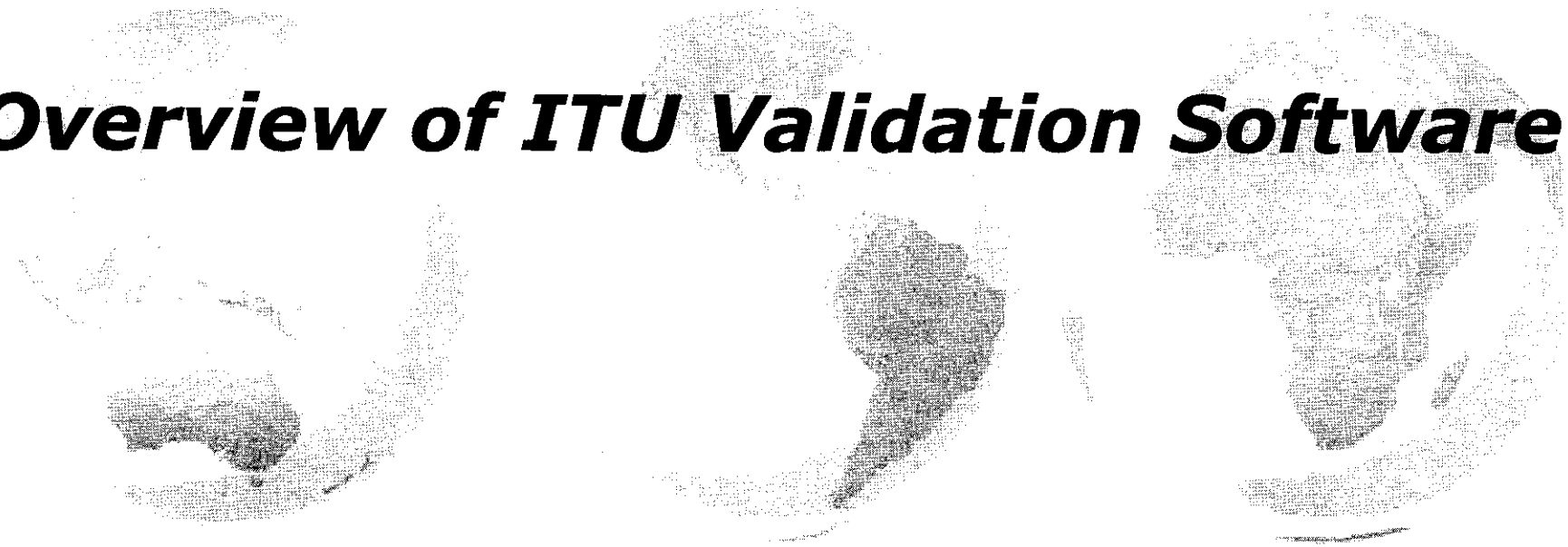
ORIGINAL

Demonstration of Compliance with Validation EPFD Limits by NGSO FSS Systems

ET Docket No. [illegible]206
IB Docket No. 01-96

Washington D.C., June 18, 2002

Overview of ITU Validation Software



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ITU Validation Software

The ITU validation software was developed to meet several requirements:

- The software had to take into account the fact that
  - NGSO FSS system operational parameters change over time in response to changes in markets served, number of subscribers, etc., and,
  - Certain NGSO FSS system operational parameters, such as traffic levels, are commercially sensitive.
- The software had to be generic, i.e., appropriate for use with all types of NGSO FSS constellations and interference mitigation techniques.

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ITU Validation Software

In view of these requirements, use of detailed simulations, based on the actual operating parameters, was rejected as a method of assessing compliance with the validation limits.

Instead, an "envelope" approach was adopted.

- **The computations employ "PFD" masks representing the power from each satellite at worst-case power levels and beam configurations.**
- **The PFD masks are then used to determine the worst case power level from the system as a whole into any GSO location anywhere in the world. This worst-case level must meet the validation EPFD limits.**

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ITU Validation Software

The PFD mask approach avoids the need for a detailed simulation, while still ensuring that the worst-case interference will be "captured" by the validation software.

This permits the analysis to be independent of:

- **The traffic level and distribution of customers, which involves proprietary information.**
- **The strategy used by the NGSO FSS system to handover traffic from one satellite to another, which is subject to change over the life of the system.**

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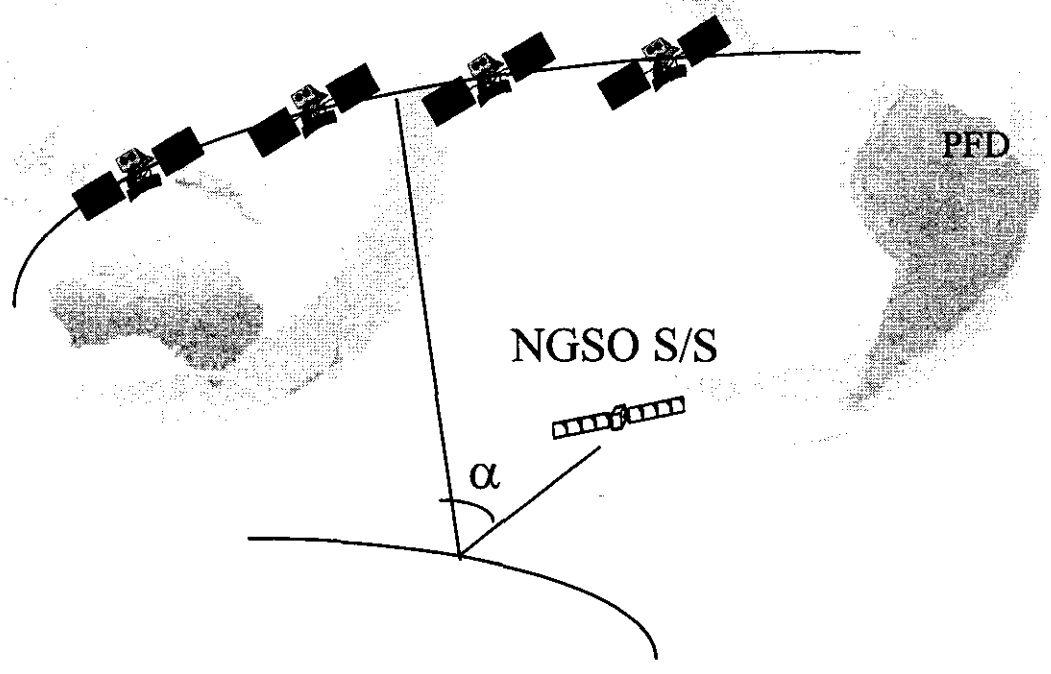
ITU Validation Software

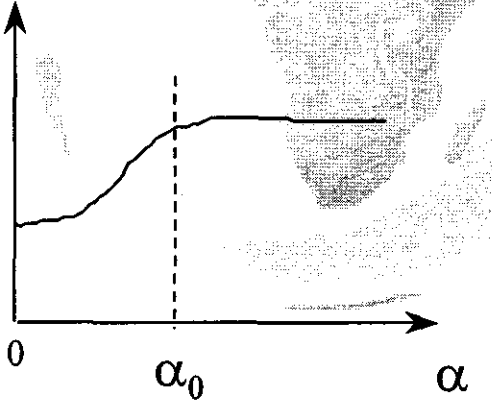
(1) The PFD mask is defined as the maximum power flux density generated at the earth's surface by an NGSO satellite as a function of:

(1) The latitude of the NGSO satellite

(2) The separation angle (α) between the NGSO satellite and the GSO arc

(3) The delta longitude between the NGSO satellite and a point on the GSO arc





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ITU Validation Software

(2) A PFD mask is applied to each satellite.

(3) The EPFD statistics are then computed by simulating the movement of the satellites in the constellation and summing the PFD radiated by the NGSO satellites at the input of a GSO receiver at each time step.

(4) The validation software computes the worst result for any GSO satellite and any location on on earth. That is, the result indicates that a worst-case EPFD level, X, occurs at a location on the earth, Y, when that location is being served by a satellite at location Z along the GSO arc.

(5) If the EPFD level X meets the validation EPFD limits, then by definition the limits are met on a worldwide basis.

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ITU Validation Software

As a result of the "envelope" approach, the ITU validation software over-estimates the interference statistics that can be expected in practice:

- **The results *do not* predict actual interference levels**
- **The results *do* ensure that the system will not exceed the validation limits anywhere at any time**

(To bound actual interference levels, other, tighter, "operational" limits apply. Compliance with these is NOT assessed using the ITU validation software.)

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ITU Validation Software

Status of ITU software tool:

- **The software specification for the ITU software is complete, and was adopted at WRC-2000.**
- **However, the ITU does not yet have an approved software tool based on that specification.**
- **For FCC purposes, parties can use the software specification to create their own software, and, in fact, this is the approach contemplated in the FCC Rules.**

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ITU Validation Software

The ITU has recently commenced the process to determine compliance of the ITU-filed NGSO FSS systems:

- **All systems, including all U.S.-filed systems, are required to provide the PFD masks and other input parameters required by the software specification by late September, 2002.**
- **The ITU will determine compliance when a software tool has been approved.**

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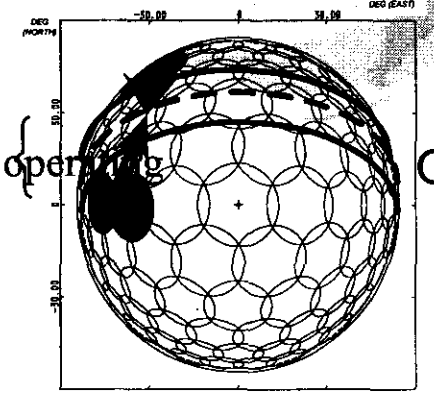
ITU Validation Software

Producing the PFD masks is computation and labor intensive, requiring several weeks, or even months.

- **The mask needs to be computed for each latitude (0.1° step so 730 latitudes),**
- **for every sub-satellite point, the worst combination of contributing cells is chosen (9 cells over 85 possibilities so C_{85}^{9} , over 4*10^11 possibilities)**
- **The sub-satellite field is divided 265000 points (500 per 530 grid)**
- **This gives a total of more than 8*10^19 operations**



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SkyBridge's Petition for Reconsideration

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Petition for Reconsideration

The FCC Rules add requirements for results that are not contemplated by the ITU software specification:

- **For $EPFD_{down}$, results for the worst 3 test points in the U.S. and on each continent, and as many points as the number of service areas, i.e., footprints.**
- **For $EPFD_{up}$, results for every 2° longitudinal location along the GEO arc (that is visible to the U.S.) for domestic service, and every 3° longitudinal location along the GEO arc for service outside the U.S.**

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Petition for Reconsideration

SkyBridge has petitioned for reconsideration of these aspects of the FCC Rules because:

- **The ITU software specification has not been designed to perform such calculations.**
- **The requirements force applicants to make assumptions, which will likely lead to disputes.**
- **The extra information serves no useful purpose.**

(See Petition for Reconsideration of SkyBridge, ET Docket 98-206, Mar. 19, 2001)

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Petition for Reconsideration

$EPFD_{down}$

- **No definition exists for the "worst three test points."**
  - **EPFD statistics are represented by *curves* specifying maximum power levels for any given percentage of time.**
  - **The ITU reached agreement on the definition of "worst-case" only, and adopted a procedure for finding only that the worst-case configuration (ITU-R Rec. BO.1503)**
  - **It is not clear how that definition and procedure could be extended to the next two worst-case points, nor the worst-case over a particular region of the world.**
- **"Service areas, i.e., footprints" are not static.**
  - **Not all systems employ "sticky beams"**
  - **Even for those that do, the coverage of beams can change over time**

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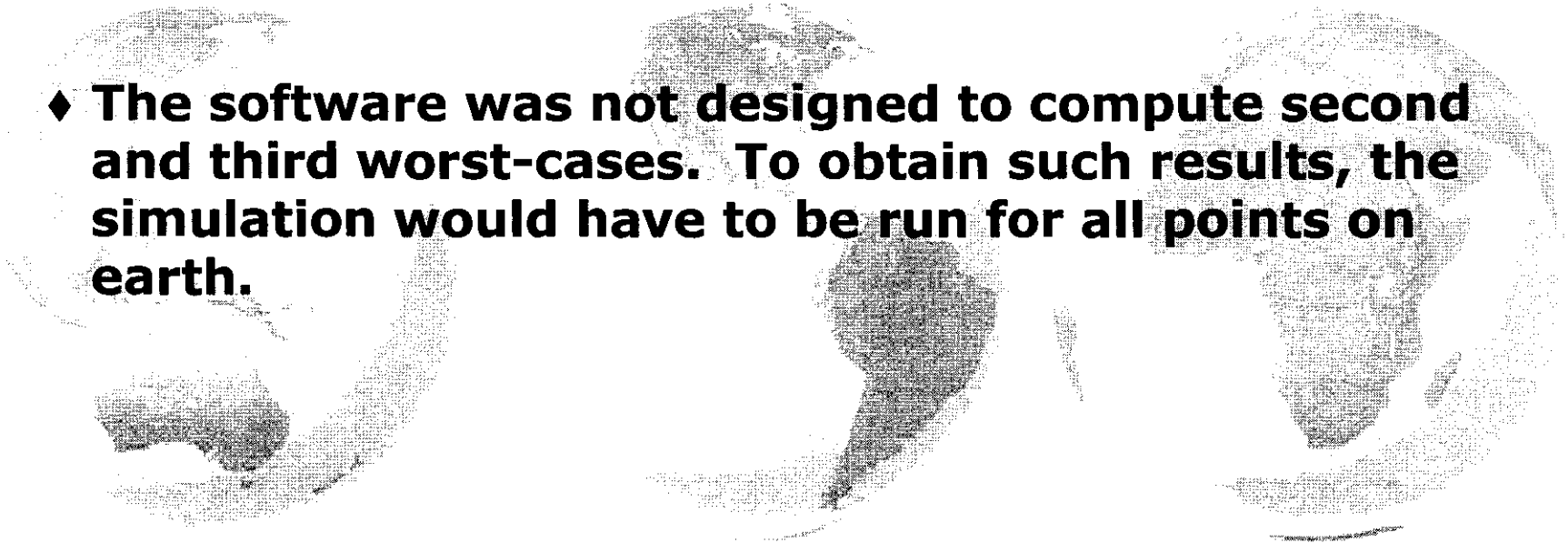
$EPFD_{down}$ (cont.)



- The software was not designed to compute second and third worst-cases. To obtain such results, the simulation would have to be run for all points on earth.

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$EPFD_{up}$

- **Separately checking each point along the arc will be unreasonably burdensome in terms of computational time and resources, for the reasons given above.**

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None of these extra results are necessary:

- **They do not help determine whether the validation limits are met, because if the worst-case result complies with the limits, the limits are met by definition.**
- **They provide no useful information to GSO operators, because the software does not predict actual interference levels.**
- **Both the software and inputs will be publicly available, and GSO operators may perform the computations for their particular points of interest.**

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